INDEX OF SURGICAL PROGRESS.

GENERAL SURGERY.

I. Bacteriology in Its Relations to Surgery. By Henry Power, F.R.C.S. Fungi-looking at them essentially from a hygenic, and not from a botanical, standpoint, may be divided into four groups: (1) The fungi proper, (2) the mycetozoa, (3) the blastomycetes, and (4) the schizomycetes.

The most important to the surgeon is the last group, viz, schizomycetes, which have been thus classified by Klein. Micrococci, bacteria, bacilli and spirilla, and each of these he divides into those that are septic, those that are zymogenic, those that are chromogenic and those that are pathogenic.

Septic microbes are those which excite, or at least accompany, the putrefaction of organic matters; their action on proteids resembles digestion, the first products being peptones, then leucin, tyrosin, and the fatty acids, and finally iodol, phenol, scatol, hydrogen sulphide, ammonia, carbonic acid and water.

Zymogenic microbes are those which cause fermentation. The chief forms are (1) the alcoholic, (2) the lactic, (3) the viscous, (4) the acetic, (5) the ammoniacal, (6) the butyric, (7) the putrid fermentation. The chromogenic microbes develop coloring matter.

The pathogenic microbes are those which are capable of generating disease, and the evidence on which this disease-producing power rests, it must be admitted, is sufficiently satisfactory, for no microbe is considered to be the cause of a disease unless it is, in the first place, found to be constantly present in that disease, either in the blood or in the tissues; secondly, that when carefully isolated and cultivated it can, when introduced into the body of a healthy animal, give rise to the original disease, and be again found in quantity in the body.

True breeding. A considerable divergence of opinion still exists as to whether the various forms of microbes are really especially distinct from each other, and whether successive generations so far retain their characters that they may be held, supposing the conditions to be similar, to breed true. This is obviously an important point from a sanitary and hygenic point of view, for as Mittenzeig has well expressed it, if a form of microbe which has been proved to possess injurious qualities can be developed out of a harmless form, it is impossible that we should ever be able to establish sanitary measures that are of the least value, since we are always surrounded by millions of germs which may at any moment develop into a dangerous enemy. On the other hand, if these prove to be specific varieties, it is possible, that by gaining an accurate knowledge of its life history, its mode of origin, its favorite haunts, its mode of attack, the conditions of temperature and soil which are most favorable to its growth, its fruiting, the germination of its spores, and the like, we may learn to know our enemy and may adopt precautionary measures which shall have for their object the extermination of the species in question.

Micrococcus. Several forms are found in diseases associated with man. Staphylococcus pyogenes, found in pus, acute abscesses, empyema and osteomyelitis. Micrococci of pyæmia and septcæmia have been described. Pyæmic micrococci are round and measure $^{1}/_{100000}$th of an inch; septicæmia M., are oval and $^{1}/_{25000}$th inch. In 1879 Neisser demonstrated a microbe which is intimately connected with the whole group of purulent and contagious diseases of the mucous membranes. Bokai and Imkelstein produced gonorrhœa by introducing pure cultures of this micrococcus into the male urethra, which were rendered inert by the addition of small quantities of eucalyptus oil. Haab found that the cocci of purulent ophthalmia was identical with that of gonorrhœa. The streptococcus erysipelatosis was first noticed by Lukomsky, who found it at the margin of an erysipelatous area where the disease was making active progress. The microbes in the centre of the area were dead. Fehleisen has continued the culture through seventeen or more generations on steralised gelatine, and has still found that when inoculated into patients with a view of curing lupus, cancer and sarcoma, a typical attack of erysipelas was produced.

It would appear that there are more kinds of micrococci than one found in cases of acute ostemyelitis, and probable M. pyogenes aureus co-operates with M. pyogenes albus, and some forms of bacilli.

Bacilli—A typical example is the bacillus of anthrax; no spores are formed by it in the animal body; it increases only by fission in that situation. This bacillus is interesting in three ways; first, because it was the first instance in which a microbe was shown to induce disease; secondly, because it can attack man as well as animals, though certain breeds appear to be exempt from its attacks; and lastly, because by inoculation its virulent effects can be greatly modified.

Bacillus of Syphilis—Lustgarten, by special staining, has demonstrated the presence of a microbe peculiar to syphilis. They resemble those of tubercle, are usually curved, sometimes in opposite directions, average 4.5 μ long. They are exceedingly rare and occur in groups of from two to eight situated in large oval or polygonal cells. Strümpell has endeavored to show that locomotor ataxia may be caused by the microbe of syphilis, starting with the assumption that sixty per cent. of ataxic patients have had syphilis. Professor Hügge states that he has obtained pure cultures of a tetanus microbe. Carle and Rattone produced symptoms resembling tetanus in rabbits and guinea-pigs by inoculating from wounds in tetanic patients. As the bacillus does not appear very abundant, it is difficult to understand how the simple growth of a fungus could produce such violent effects on the nervous system, and it seems more probably that, as the old supporters of the zymotic nature of tetanus thought, some kind of poison resembling strychnine is generated by the bacillus. We may suppose, then, that the bacilli, streaming forth from the wound as from a centre, distribute themselves through the body, and, further, that each bacillus lying in tissue represents a small but constantly acting source of poison, which first affects its own immediate vicinity, but as a consequence of absorption and in co-operation with others, affects ultimately the whole body, and we may thus explain the local tone and tension,its gradual extension, and finally the affection of the whole system. It is interesting to consider how these organisms exert their baneful influence on the living bodies of the higher animals." There are four ways in which we may explain the action of microbes upon the infected animal (1) they may consume the store of pabulum of the cells: (2) by the discharge of excreta into the body of the animal on which they are living; (3) interfering with the due performance of the functions of the various depurating organs; (4) that their pernicious action is due, not to what they take or what they excrete, but to what they leave, and this is clearly allied to their imperious demand for oxygen. Thus chemical compounds named ptomaines are formed, and are believed to be the really poisonous agents. The difficulty that will strike everyone is, how is it, if the air is swarming with these ferocious microbes, that we do not all succumb to their attacks. The answer is, that healthy cells are able to withstand the attack of the microbes, and only when the cells are injured by mechanical or chemical means can the microbes prevail and gain admission, and finding a suitable soil multiply, and these by their mere numbers or by their effects, prove injurious or fatal to the whole body.—*Lancet*, Dec. 11, 1886.

H. H. TAYLOR (London).

II. The Etiology of Tetanus. By M. LARGER. The author brought some new facts before the Surgical Society of Paris to support his theory of the contagiousness of tetanus. They were taken partly from human pathology and partly from veterinary surgery. The first relate to a small epidemic of tetanus observed at the hospital at Colmar.

In January, 1882, a man died from tetanus following a wound of the hand. A few days aftewards a man suffering from a wound, also of the hand, was placed in the same bed; he developed tetanus and died. At the same time a child of seven was lying in the next bed. After the performance of amputation of the thigh, he also succumbed to tetanus. Last of all, in September, 1886, four years and a half afterwards, a man with a wound in the finger was placed in the bed occupied by the first tetanic patient. He contracted tetanus, but did not die.